MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2018/2019

PBM0054 – MATHEMATICS

(Foundation in Business)

31 MAY 2019
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 2 pages with **FIVE** questions.
2. Attempt **ALL** five questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

QUESTION 1

a. Simplify: $\left(\frac{-7a^5b^4c^2}{3a^{-2}b^5c^{-4}}\right)^{-4}$. (3 marks)

b. Simplify: $\frac{\frac{1}{y^2}-1}{1+\frac{1}{y}}$. (4 marks)

c. Factor: $3(x+1)^2+2(x+1)-21$. (4 marks)

d. Solve: $\sqrt{2a+11}-\sqrt{5a+1}+1=0$. (10 marks)

e. Determine the domain of the function: $f(x)=\frac{\sqrt{x}}{8x^3-27}$. (4 marks)

(Total = 25 marks)

QUESTION 2

Solve for x in the following equations:

a. $5+e^{x+1}=18$ (3 marks)

b. $3x\,a^{6\log_a x}=384$ (4 marks)

c. $\log[\log_{12}(3+\log_2(x+5))]=0$ (5 marks)

(Total = 12 marks)

QUESTION 3

Solve the following system of linear equations using the inverse of coefficient matrix.

$$x-2y-2z-3=0$$
$$2x-4y+4z-1=0$$
$$3x-3y-3z-4=0$$

(13 marks)

(Total = 13 marks)

Continued...

QUESTION 4

a. Find the $\frac{dy}{dx}$ for the given functions and simplify the answers.

i. $y = \left(\frac{x^2}{36} + \frac{2}{\sqrt[4]{x^3}} - \frac{x^{-6}}{4} \right)^4$ (5 marks)

ii. $y = \frac{(2x-3)^2}{(x+2)^3}$ (5 marks)

iii. $y = 4x^3\left(x^4 - x^2 + 5\right)^5$ (5 marks)

b. Find $\frac{d^2y}{du^2}$ for $y = 5\sqrt[3]{u}\left(4u^{-\frac{3}{2}} + u^{-2} + 2u\right)$. (5 marks)

c. Find the equation of the tangent line to the curve $y = 3\sqrt{x} + \frac{1}{2\sqrt{x}}$ at $x = 4$.

(5 marks)

(Total = 25 marks)

QUESTION 5

a. Integrate each of the following integral.

i. $\int \frac{2x^5 - 7x^{\frac{1}{4}}}{3x^2}\, dx$ (3 marks)

ii. $\int_1^8 \left(x^2 - 6\right)\left(3 + \sqrt[3]{x}\right)\, dx$ (8 marks)

iii. $\int_2^3 \frac{5x^2}{\sqrt{x^3 + 8}}\, dx$ (7 marks)

b. An environmentalist finds that a certain type of tree grows in such a way that its height $h(t)$ after t years is changing at the rate of

$$h'(t) = 0.2t^{\frac{2}{3}} + \sqrt{t} \quad \text{feet/ year.}$$

If the tree was 2 feet tall when it was planted, how tall will it be in 27 years?

(7 marks)

(Total = 25 marks)

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